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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/553,849

10/20/2005

Hiroyasu Saka

TAN-355

6309

7590 09/07/2007
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EXAMINER

PARVINI, PEGAH

ART UNIT

PAPER NUMBER

1755

MAIL DATE

DELIVERY MODE

09/07/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/553,849

Applicant(s)

SAKA ET AL.

Examiner

Pegah Parvini

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1755

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5 and 10 is/are rejected.
- 7) ☒ Claim(s) 3, 4, and 6-9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Any rejection and/or objections, made in the previous Office Action, and not repeated below, are hereby withdrawn.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Claim Rejections - 35 USC § 103

1. Claims 1, 2, 5, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/24605 to Saka et al.

Although the rejection of claim 1 under 35 U.S.C 103(a) is made over WO 02/24605 to Saka et al.; however, for convenience, US Patent Application Publication No. 2003/0162483 to Saka et al., which is the English equivalent of the WO application, is used below.

2. Regarding claim 1, Saka et al. teach shot-blasting of a sintered body of ceramic, such as knife edges, which results in toughening and modifying the ceramic product ([0019], [0020]). The particles used in shot-blasting consist of fine particles having an average particle diameter of 100 μm or less and are made from carbide alumina ([0019], [0031]). In addition, the reference discloses that the conditions for shot-blasting treatment depend on the hardness of the shot, particle diameter, impact speed, etc ([0033]). Moreover, the reference discloses that an optimum condition for each material should be selected to obtain the desired result; therefore, it would have been obvious to

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have selected particles, such as alumina, in which the Vickers hardness difference of greater than 500 HV exists between the shot particles and the ceramic body in order to reduce the irregularities, such as roughness, on the surface layer and increase the thickness of the plastically deformed layer ([0033]).

Even though the Saka et al. does not expressly disclose that a uniformly distributed linear dislocation structure is formed in substructure region of the ceramic product, the formation of the linear dislocation is assumed to be inherent to the substantially similar process of surface toughening a ceramic body, such as shot-blasting, using abrasive particles, alumina, within the particle range of less than 100 μm as disclosed by Saka et al.

3. Regarding claims 2 and 5, although the prior art do not expressly disclose a specific range of dislocation density, it would have been obvious to obtain this specific range of dislocation density motivated by the fact that the prior art disclose a substantially similar process of surface toughening procedure.

The dislocation density is assumed to be inherent to the process of surface toughening disclosed by the reference, which is substantially similar to the claimed process.

4. Regarding claim 10, it would have been obvious to have particles having a hardness greater than that of the sintered material cutting tool motivated by the fact that

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the shot-blasting and surface toughening process is to toughen the surface; therefore, the shot particles need to have a hardness greater than that of the cutting tool.

Response to Arguments

Applicant's arguments, see pages 5-13, filed May 18, 2007, with respect to the rejection(s) of claim(s) 1-5 under Title 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of WO 02/24605 to Saka et al.

Allowable Subject Matter

Claims 3, 4, 6-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: As indicated in the prior Office Action, the prior art do not disclose or suggest a process of surface toughening of a ceramic tool at a pressure of 0.1 to 0.5 MPa, a shot-blasting speed of 20m/sec to 250m/sec, a shot-blasting amount of 50 g/m to 800 g/m and a shot-blasting time of 0.1 sec/cm² or more to 60 sec/cm² or less.

Conclusion

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

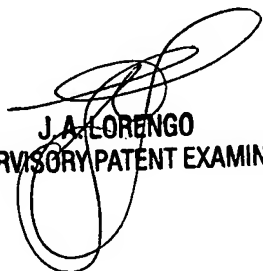
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pegah Parvini whose telephone number is 571-272-2639. The examiner can normally be reached on Monday to Friday 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PP


J. A. LORENZO
SUPERVISORY PATENT EXAMINER